**THE MINISTRY OF EDUCATION
OF THE KYRGYZ REPUBLIC**

**KYRGYZ STATE TECHNICAL UNIVERSITY
under the name of I. Razzakov**

BACHELOR'S FINAL PAPER (BFP)

Methodological guidelines for a bachelor's degree qualification for students in the direction of 710100 - Computer Science and Engineering

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Methodical instructions on performance and defending of final bachelor works. Intended for students specializing in «Computing and Automated Systems Software» for all forms of training.

Bibliography. 1 title

Reviewer: KSTU named after I. Razzakov «Software Engineering» department docent Indira Musina

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Introduction

According to the curriculum KSTU Bachelor's final work is defended by the students at the end of the fourth year of study. After successful defending of the work the student is assigned an academic qualification degree in the field of "Computer Sciences" and awarded a Bachelor's degree.

A final work on the Bachelor's degree must demonstrate the applicant's ability to analyze relevant subject area, to solve specific problems and to give a fairly complete picture about mastering basic subjects studied by applicants.

Bachelor's graduate qualification work should have a bachelor's internal unity and completeness, reflect the progress and outcomes of the chosen theme, match with the current level of science and technology development, and the theme should be actual.

1. AIMS AND OBJECTIVES OF THE BACHELOR'S FINAL PAPER

After successful competition of the theoretical training courses the student is preparing to defend the final work in the State Certification Commission (SCC) meeting. In accordance with the regulations about the Final State Certification of the graduate students of the Kyrgyz Republic Universities, student's final works done in the forms corresponding to the specific stages of the Higher professional education:
- For the academic Bachelor degree - in the form of a Bachelor's final work;
- For a professional qualification degree of a specialist – in the form of thesis(project);
- For the academic Master degree – in the form of Master's thesis

During the fulfillment of Bachelor work students acquire skills of independent engineering and research. Herewith, special attention should be placed on the collection and analysis of materials derived from the scientific and technical literature (monographs, collection of articles, periodicals, conference proceeding, etc.)

Fulfillment of the final Bachelor's work is the final phase of student's university study and it has the following objectives:
- systematization, consolidation and expansion of theoretical and practical knowledge according to the direction and the usage of this knowledge while solving specific scientific, technical, economic, industrial, legal and educational issues;
- developing of skills for independent work and mastering with the technique of research and experimentation while solving problems and issues of the work ;
- clarification of student's preparedness to the independent work done in the conditions of modern production and technology, economics and culture.

A student should demonstrate his knowledge, skills and experience while working under the project construction work at different stages of PP projecting PP(Program Product).

What's it PP:

Designing any PP contains several development stages: pre-designing stage, development of technical tasks and technical proposals, conceptual design, engineering design, operation (or techno-working) design and implementation phase.

Since the bachelor final work is the student's qualifying work, which confirms his qualification, it should be done in compliance with the requirements of modern GOST standards related to the theme of a specific project.

Bachelor's final work should contain a working model of information and software in the form of text applications, requests, etc. at the appropriate level of algorithmic languages.

Based on the objective of the Bachelor final work, any baccalaureate final work should include two parts associated with three types of work carried out by the designer:
-external design of the PP;
-internal design of the PP.

The result of this work with external design is a structural shape of a created PP and a technical task on designing PP. The external design is related to the stages *of pre-project examination, development of the technical offer and technical task.*

The work done by the designer at these stages let him to:

- Master the subject area for the operation of which a software product is consigned;
- To find out the functions of users that need to be automated;
- To determine (to develop) the options on using the PP in the form of UML-diagrams;
- To form the criteria for assessing the quality of generated PP (this may include: speed capability, convenient user interface, the requirements to the technical means, etc.);

Interior designing is associated with the project work, performed on the stages of conceptual design, engineering design and working (or techno-worker) design. This allows conducting not only the actual design of a particular PP, but:

- Reasonably choose the mathematical methods of information processing;
- To base and choose an algorithm;
- To develop the user interface;
- To select a programming language;
- To develop and test working programs of software components.

Considering a qualifying type of a final work, each bachelor final work should contain the following:

- Detailed information about knowledge domain (its model, list of functions performed by the system, quality assessment criteria, etc.);
- Technical task to develop a PP;
- Description of algorithms for data processing;
- Justification for the complex of the technical facilities choice and software packages;
- The results of database design;
- Description of a user intercommunication interface with the system;
- User manual;
- Programmer manual.

2. TOPICS OF THE FINAL PAPER

The subject of the bachelor final work must be characterized by its social value, determined by the order of enterprises and organizations, reflect the real needs in solving the actual problems and be practical.

According to the accepted terminology, in the subject of the Bachelor final work, the following classification of the project is used.

According to the degree of reality:

- **Training** is the project where the object of development is set not according to the real manufactured products and the company, etc., but according to a documentation given abstractedly (for training purposes from the textbook,

workbook, etc.). For example. "The development of reliable software on cryptographic protection of information on the language Visual C++");

- **The real project** is the project given by the technical documentation of the real object with which the student may get acquitted during the technological practice. In this case, the subject of development can be software for information management systems of industrial enterprises, organizations, banks, and complexes of programs that support the functioning of the real objects (automatons, machines, telecommunication networks, etc.). In the performance of these projects, students must consider the real conditions of the facility automation operation. For example, "Creating a system of accounting and distribution of loads for KSTU teachers by means of Delphi";

- **According to the enterprises order** the project is considered to be completed when a topic and a brief technical task is proposed to enterprises by an official letter and a project (or a part of it) is transferred to the company to be considered for implementation.

In the development of this project the specific conditions laid down in the requirements specification and other specific production conditions are taken into account. For example, "Designing of an information portal developed by the database of Mandatory Health Insurance Fund using Internet-technologies";

- **The project with the enterprises review** about the implementation possibility is the project made on a specific enterprises instruction with the development of it till the technical project by which the rework till the complete set of technical documentation is possible. Developments carried out in the design process coordinated with the enterprises and officially sent them for further implementation. The degree of reality of this category of project is the most complete. For example, a project on "Development of higher education students automated system of accounting in an FoxPro environment" has a university administration review of the Kyrgyz State Law Academy about the implementation of the system into the experimental-industrial operation.

According to research.

In each of the above mentioned types of projects there can be inserted investigation of different complexity. According to this 4 categories of projects are possible (listed in order of increasing of studies complexity):

- **No research** are called projects, executed correctly with the appropriate engineering calculations, but without creative searches, and even without a review of the state of matter corresponding to the topic of the project;

- **An overview of the state of matter** called a project in which there are no experiments and methods of research, but provides a complete overview of the literature data on the topic of the project and made its analysis, i.e. this project has elements of creativity;

- **The project with the development of methodology research** is the project, which is in addition to reviewing the state of the question, and select the most advantageous variants of the designed object has developed a feasible method of its study;

- **The project with an experimental research** is the project in the performance of which, after reviewing the state of the question, development of methodologies, research, design and development of a software product, were performed experiments and the results processed in the form of graphs, formulas, etc. with subsequent conclusions. For example, the project on the subject "Realization of Synthesis Process Modelling System and Digital Fourier Hologram Recovery by Li's Method in the Delphi Language".

It is allowed to issue typical (model) themes and the themes of work\statement for final preparation for the learning process. For example, "Creating an accounting system and distribution of loads for KSTU teachers by means of Delphi".

The subject of Bachelor final work is a subject (or object) of development or researches. The name of a subject should briefly and unambiguously reflect a task and the content of final work, i.e. it should be a verbal formula of the task and the main information content of work as well, provide the correct information classification of the project which is necessary in publication of materials, transferring project documents to a customer if it is available, and also for creation of fund of final works on department.

The following order of selection and approval to the Bachelor final work is determined:
- A general list of bachelor final papers themes is updated annually;
- Student has the right to choose the theme of bachelor final work from the number of proposed by the issued department;
- Student can offer his own subject with necessary justification of expediency of its development;
- It is permitted to perform complex work, i.e. they can be performed by a few students;
- The project should have novelty and provide the development of new, modernization or the improvement of existing (or projected) software products.

The theme of final work, task for their performance, the list of graduate students, executives and consultants are approved by consistently producing department, dean and the university order.

3. ORGANIZATION OF FINAL WORK

Performing a Bachelor Final Paper (BFP) includes the following main stages:
- Selection and approval of a BFP topic;
- Development and approval of the task for a BFP;
- Collecting material for design (it is possible on a place of passing of technological practice);
- Preparation and execution of explanatory notes and graphic material included in a BFP;
- Providing a project to the department and training performance at the State Certifying Commission (SCC)
- Preliminary BFP protection in the department;
- Addressing a project for review;
- Protection in the SCC.

3.1 The subjects of works are selected by students together with the supervisor. The supervisors should announce students the topics for final works in advance. The subject reported to the department and is available during the whole term of the bachelor work accomplishment. Subjects of work should cover different areas of application of information technology; it should be modern and reflect the specialization of the department.

3.2 The subject of each work is being improved at a chair's meeting or by the head of the department at the beginning of the term given for Bachelor thesis.

The students, who are fully complied with all the requirements of the curriculum, successfully passed all forms of interim control and who have passed the final state exams are allowed to perform the final work.

The following order of BFP leadership is determined:

- Department provides guidance and monitoring of the final works performance through the supervisors determined by it;
- Leading teachers of graduating department are appointed as the supervisors of works, scientists and highly skilled professionals from other institutions and companies related with basic education can also be a supervisor;
- Supervisors of graduate work are approved by the dean of the faculty according to university department representation;
- Supervisor of the work:
- Gives assignment to BFP;
- Helps a student to develop a calendar schedule of work for the entire period of work on BFP;
- Recommends a student basic necessary literature, reference and archival materials, sample projects and other sources according to the subject;
- Carry out systematic work with a student on performing BFP;

- According to FBW supervisor's proposal, in case of need, the university department appoints consultants for separate sections of work at the expense of a limit of time allowed for the FBW management;
- Consultants of separate sections of work are appointed the university professors and teachers, as well as highly qualified specialists and scientists from other institutions and companies who are consulting and checking appropriate part of a student's work and then put signature.

Chart of the BFP fulfillment

Before starting work a student together with supervisor develops the schedule for the entire period with the indication of sequence of performance of separate stages, consultations according to sections and then submits it for approval to the manager of the issuing department.

Dean of the Faculty (The Head of the graduating department) sets the terms of students' periodical report on their final work fulfillment. In case of considerable lag from the schedule of final work, bad quality of its performance, the graduate, according to the decision of department isn't allowed to protection.

4 CONTENT AND VOLUME OF THE BFP.

Structural elements of the BFP are: explanatory note, the graphics part (slides, posters), software, or other results (displayed on a PC) and other materials prepared by the undergraduate student.

An explanatory note should include: the title page in the Kyrgyz language, the title page in Russian, the form of estimated – explanatory notes, annotation, form of task for graduate work, task, annotation, contents, introduction, main ("the design") part, conclusion, references, and application. The content of the explanatory note can be changed by the graduate department according to the specific topics of BFP and is specified in the task. Supervisor's review put in (NOT FILED) in an explanatory note.

The volume of the explanatory note is recommended no more than 50 pages without attachments.

The title page of the explanatory note of the BFP includes the following information:

- Full name of the Department and the University;
- The name of the graduating department;
- The name of the document type: BFP (Bachelor Final Paper)
- The topic name of the BFP;
- The following words: *"for a qualification bachelor's degree in the direction: 552800 Computer Science and Computer Engineering";*
- Inscription as "Completed:" and a surname with the initials of a diploma project (work) author;
- Inscription as "Supervisor:" and a surname with the initials of a supervisor;
- Place and the year of execution ("Bishkek-20..").

(The sample of filling of a title page is given in the Appendix 1)

A form of the settlement – explanatory note includes:

- The full name of the Ministry and the University;
- Name of the faculty;
- Name of the graduating department;
- Subject name of the BFP;
- Information about the author (name of the group and full surname, first name, patronymic, signature);
- Information about the supervisor of the project (full surname, first name, middle name, signature), supervisor's signature testifies about the preliminary admission to the BFP defense;
- Information about the BFP consultants by section (bachelor's graduation work) (academic degree, academic rank, surname and initials, signature , date), consultant's signature testifies that the appropriate section of the project is executed in accordance with the task and in the necessary volume;
- Information about the compliance supervisor (academic degree, academic rank, signature, surname and initials), date; the signature of the BFP (Bachelor final work) with standards;

-     An inscription "Project is allowed to defense", "Head of Department (Graduated)", surname and initials of the head of the department, the signature; The signature of the head of graduating department certifies the approval of the BFP and the admission of the student to review and protection;

-     Surname, reviewer's initials and his signature; reviewer's signature certifies that BFP has passed reviewing;

-     Place and year of fulfillment.

-     A form of the settlement – explanatory note filled in the Russian or Kyrgyz languages. (See Appendix 2).

The task for executing the BFP is a normative document that establishes the boundaries and depth on developing the topic, as well as the deadline for presentation the final work on the review in a final form, and approximate date of defense. It is necessary to include the research part in the BFP task, starting with a review of the state of the issue, check the novelty of the proposed solutions and the possibility of an application for invention, and the justification of decisions, preparation of research methodology, carrying out researches, the need for technical literature as separate publications and periodicals.

The task for the BFP is written on a standard form.

On the first page of the form of a task must be given the following information:

-     the full name of the University;

-     the full name of the graduating department;

-     the name of a group and the BFP author's full name;

-     the full name of the theme of the project;

-     number and date of the order on approving the topic;

-     the deadline for student's completed project, approved at the meeting of the graduating department;

-     basic information to the project, which should be used while performing the BFP: software tools used in the development of a software product, as well as the design of the explanatory note and the graphical part of the BFP, the list of the used sources (literature, the Internet address - websites, etc.).

On the first page of the form of the task in the upper right corner should be written the word "APPROVED", the full name of the head of the department, his signature, confirming the issuance of the task and the date.

On the second page the itemized list of questions which are subject to development in the course of working on the project has to be written down with the indication of their percentage of work in general and the term for their performance.

The third page should contain the graphical materials, which should be prepared with the indication of their percentage to the whole graphical part of the work and the term for their performance.

Graphic materials have to illustrate the content of the explanatory note of the BFP and have to consist of slides that reflect the goals and objectives of the project, the software conceptual model, mathematical models, schemes of programs and algorithms; copies of screens, description of a test example, and conclusions. If it is necessary, it is possible to present graphic material in the form of drawings. On the slides has to be presented only that material which contains the results of work of the student himself.

On the fourth page must be presented sections according to which consultations are required (besides the supervisor's consultations), a student have to indicate a surname of the consultant.

The foot of the page have to be written the date of issuance of a task by the BFP supervisor with the indication of his full name, academic degree and the rank. The supervisor's signature confirms that the assignment is given. The signature on the student's page confirms that the task is accepted to execution.

The sample of filling in the form "Task for BFP" is given in the Appendix 2.

5. THE CONTENT OF THE SETTLEMENT – EXPLANATORY NOTE

Explanatory note to the final work must disclose the creative design of the work in a concise and clear manner, include research methods and accepted methods of calculation and the calculations themselves, the description of the experiments, their analysis and conclusions on them, if it is necessary, it has to be accompanied by illustrations, graphics, diagrams, charts, etc.

Annotation is a statement of the main principles and the basic conclusions of the BFP. The volume of the annotation should not exceed one page.

The text of the annotation is written in two languages (Kyrgyz and Russian) and is formed according to the following plan: the object of research and development; purpose of the work; methods of the work; main results, conclusions, recommendations and scope of use of the work results.

Presentation of the material in the annotation must be short and precise. It is necessary to use the syntactic designs peculiar to the scientific language and technical documentation; also it has to avoid complex grammatical turns.

The content includes the serial numbers and the titles of the chapters, subchapters and applications with their designations and the titles. The content is placed on a new page. The word "Content" is written on the center of the page with the capital letters and without a full stop at the end.

The names of the structural elements as "Title Page", "Task" and "Annotation" are not given in the content of the Explanatory Notes.

The word "Introduction" is written on the center of the page with the capital letters and without a full stop at the end.

In the introduction part is given the actuality of the BFP theme, formulated objective of the BFP, purpose and the range of use of the designed project, degree of novelty, importance and limits of the development.

Main part is divided into chapters. A chapter can be divided into subchapters, paragraphs and subparagraphs. Each element of the main part has to represent a semantically complete fragment of the BFP. The structure of the main part must necessarily single out the following chapters: requirements analysis, design work, development of documentation, experimental section. Each chapter has to begin with a new leaf.

The chapter "Requirements Analysis" includes the results of the review and the analysis of current developments on BFP identified from the scientific and technical literature, in the information from the Internet - websites, in the patent

information and research reports, conference materials, etc. Here are given the classification, comparison of various approaches to the subject, methods of the solution of a task, means and methods to achieve the purpose, and the identification the positive and negative aspects. It is necessary to avoid a simple citation (duplication) of the texts of primary sources. A title of bibliographic sources and the Internet addresses has to be written in the bibliography, and the text has to provide only links to the sources.

The chapter should contain (reasonable)conclusions about the necessity of the development proposed in the final work. At the end of the chapter it is necessary to give the properties of the developed product determined by the customer or the BFP supervisor, and the requirement to the hardware components necessary for work of software.

Thus, in the chapter "Requirements Analysis " can be highlighted the following topics:
- Review and analysis of existing software systems;
- justification of need of the development;;
- determination of necessary properties of the software product and requirements to the hardware components.

In the section "Design effort" should be the results of logic design of the software: a conceptual model, a model of data streams and the functional model.

To develop a conceptual model it is necessary to define the category of persons whose activity is related with the usage of the developing software, and the goals they are pursuing while using it.

The conceptual model has to be displayed in the form of UML – diagrams of options of use by means of CASE tools MS Visio with the obligatory verbal description.

Besides that it has to be presented the models of the data streams with the indication of how the data exchange should be occurred with the help of the developing software. There should be a diagram and given a verbal description of the data movement in the system. According to the results of the streams analysis the software interface requirements are developed, and this should be presented in the chapter about the explanatory note.

If it is necessary to choose the mathematical model while developing the software, than students have to give the results of the choice. Besides this, the chapter should include the results of the algorithmic design. It means that justification of the chosen algorithm from existing has to be given, or the results of the development of new algorithm. On the basis of it the programming language is selected. In the explanatory note should be given the explanation for its selection.

Further in the chapter the organization of the data structure which is presented in the form of logical and physical model of a database model with its detailed description are described, including the links between data objects in the system.

Thus, the chapter on "Design effort" can be divided into the following subchapters:
- development of a conceptual model;
- development a model of data streams;

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- development of a functional model;
- choice of a mathematical model and a solution method;
- development of algorithm;
- development of the user interface;
- choosing and justification of the programming language;
- organization of the data structure.

The chapter <u>"**Development of documentation**" describes</u> the project solutions for the software. It has also be described the requirements for the hardware and software. It is necessary to submit the name, designation and the short characteristic of the chosen operating system and its version within which the developed programs, demanded processors, random access memory, a place on the hard disk, and also necessary peripherals will be carried out.

In addition to this the chapter has to provide a description of the program, a programmer's guide and a user manual.

In the description of the program it is specified a purpose and a function of the software, programming tools and information technologies that were used in its creation, the modes of the software operation, as well as data transmission technology.

The Programmer's Guide provided the names and functions of the modules included in the software, the input and output data, messages to a programmer and a user during the software operation with the causes of their occurrence, and the possibility of expanding the software functions with the indication of how to do it.

The user manual provides a detailed description of its work with the software: how to run a program, how to get into a particular mode, and what kind of messages appears on the screen during its operation and how to react with them.

Further, if it is necessary, an administrator's database guidance could be provided in the chapter.

Thus, the chapter "Development of documentation" may include the following subchapters:
- requirements for the hardware and software;
- description of the program;
- programmer's guide;
- user manual.

The <u>"**Experimental Section**"</u> presents the results of testing the program in the different modes, which confirm the efficiency of the software. In this section, it is necessary to submit the appointment of the software (the list of parameters and brief description of the functions from the number of realized software and checked by a control example), the input data to verify the program, the results of processing of basic data by the program.

Testing program should be carried out in normal and extreme conditions, as well as in the exceptional situations.

Operation under the normal conditions means the correct data entry and the normal operating mode of hardware.

Operation under the extreme conditions means incorrect initial data entry by the user or the value entry is outside the limits permitted by the software operating conditions.

Software testing in the exceptional circumstances means checking it during the failures of the power supply system, resistance to hacking attempts and losing network connection, as well as trying to turn to the server of several hundred users.

There should be submitted the initial data forming procedure to verify the software, invoking the program and getting the results of the software operation, which should confirm the efficiency of the program in all types of situations.

The **"Conclusion"** chapter summarizes the main results of the BFP. The structure of this chapter should comply with the instructions on the BFP. The conclusion's content includes:

• the main results in the form of quantitative and (or) qualitative indicators, parameters and characteristics for each BFP section and recommendations for their usage;

• if the work is not received a final result and the technical documents are not ready for practical use a list of questions for further work is given;

• estimates the completeness of solutions of objectives, scientific and technical level of the performed work in comparison with the best achievements in the field are given.

The results in the conclusion are the basis for the "Annotations" as well as for the preparation of the report for the BFP protection. *In the conclusion it isn't allowed repetitions of the content of introduction and the main part, particularly the conclusions made according to chapters and subchapters.*

References (sources used) contains a bibliography and a list of the Internet - sites.

In **the appendix** the material supplementing the content of the final work is made out. Here can be provided:
- conceptual model;
- Data Models;
- program listing;
- screenshot;
- tabulations;
- glossary;
- reviews on the use of the program (if available).
Glossary includes:
- A list of abbreviations, which is made out in the form of the alphabetic list adopted in the BFP text abbreviations and the full designations of concepts corresponding to them;
- a list of symbols;
- a list of used terms of the domain with their brief explanation.

Each subsequent application is made with the new page. All applications have prevailing with the explanatory note the page numbering and must be listed in the content of the explanatory notes (with their symbols and names).

6. EXECUTION OF THE EXPLANATORY NOTES

Making a text

BFP must be written in a grammatical literary language. It must be presented in print with 1.5 - line spacing and 12 - font size. You must use standard size sheets, leaving the field of 2 cm from the left side of the sheet, 1 cm – from the right, and 2 cm from the top and bottom. All project pages should have Arabic numerals, beginning with the title page, where the page number is not put. The figures are placed in the upper right corner of the page.

Each section should have a number and the title. Each section begins with a new sheet. The section title is typed in capital letters. A full stop is not assigned at the end of the title.

The references to the bibliography can be designed in two ways:

- A reference to the serial number of the source in the list of bibliography cited is enclosed in the square brackets, if necessary the number of the page to which a reference is made is specified. For example, data on growth rates of tourist streams in the world are given, dividing them with a semicolon: [6, page 45; 11, page 33] or without indication of pages: [6, 12, 30];

- Subscript links at the bottom of the page; the text of the link is denoted by a number. In this case the registration of the primary sources is carried out with the indication of page number to which a reference is made. The link in the text is designated by a figure.

Enumeration of the links can be done by page or sequentially throughout the whole text.

Applications are enumerated consecutively in the Arabic numerals. It can have a title. Each application starts with a new page. Applications are not included to the diploma project volume. Each application sheet has a headline ("Application" with the indication the serial number or the name of the application).

Making an illustrative, digital and other material

Illustrations. The number of illustrations in the explanatory note is determined by its content and should be sufficient to give the clarity and concreteness to the stated text. All illustrations (photographs, diagrams, drawings, graphics, etc.) are called as drawings. The drawings are enumerated consecutively in Arabic numerals within a section. The number of drawing should consist of a section number and a serial number of a drawing in this chapter, separated by a period (eg, Fig. 1.5, i.e. the fifth drawing of the first section). At links to drawing it is necessary to specify its full number. Drawings are placed immediately after the first reference to them in the diploma project text. If the drawing takes the whole page, then it is placed on the next page after the one where it was first mentioned.

The number of drawing has to consist of the number of the chapter and serial number of the drawing in the chapter divided by a point (for example: fig. 1.5, i.e. fifth drawing of the first section). At links to drawing it is necessary to indicate its full number. Drawings are placed right after the first link to them in the text of the diploma project. If drawing takes the whole page, it is placed on the next page behind that where it was mentioned for the first time.

The drawings should be placed so that they can be viewed without turning the BFP. If such placement is impossible, drawings have to arrange so that for their consideration you have to turn the final work in a clockwise direction. Each drawing is followed by the informative signature which is written under this drawing and begins with the drawing's number.

The tables. The digital material is recommended to design in the form of tables.

The tables are placed after the first mention of them in the text. They should be placed so that they can be read without turning the BFP. If such placement is impossible, a table has to arrange so that for their reading you have to turn the final work in a clockwise direction. When transferring the table on the next page, you have to repeat the title of the table, and write down the words "Continuation of the table" over it with the indication of the number of the table. If the head of the table is very big, it is permitted to not repeat it; in this case, columns of the table are enumerated and repeated their numbers on the next page. The title of the table is not repeated.

The tables are enumerated in the Arabic numerals within a section. The title "Tables" is placed above the upper right corner and indicated its serial number, which consists of the number of the chapter and the number of the table in this section, separated by a period (for example: Table 1.4, i.e., the fourth table of the first section). The title (name) of the table is written on the next line and begins with the paragraph. Title is written in the lowercase letter except the first one, which is written in a capital letter. The title of the table is not emphasized and quoted as well.

At reference to the table in the BFP text the word "Table" is written in an abbreviated form, and indicated the full number of the table (for example, "табл. 3.7"). Repeated references to the table are given with the clipped word "смотри " (for example: "см. табл. 3.8").

Formulas. Formulas, which have the references in the text are enumerated in the Arabic numerals within a section. Number of the formula consists of the chapter's number and serial number of the formula in this section, separated by a period (for example: "(3.5)", which means the fifth formula of the third section). The number of the formula is contained in parentheses and placed on the right field at the lower line's level of the formula to which it relates. Explanation of symbols is placed directly under the formula in the sequence of which they are appeared in the formula. The meaning of each symbol is given in the new line; the first line of the explanation begins with the word "где" (a colon did not pose after it).

7. MANAGEMENT AND CONTROL OVER THE IMPLEMENTATION OF BFP

Head of the SCS Department (Software of Computer System) appoints the BFP supervisors among the teachers of the department; according to the selected topics it can be involved practicing experts to the BFP supervision.

The supervisor of the final work is carried out the following tasks:

- According to the theme of the BFP provides the student with the task (see 3.2), approved by the head of the department, specifying the deadline of the project

theme and presenting the complete BFP. This task together with the diploma project presented to the State Attestation Commission (SAC).

- show assistance to the student in preparing the schedule diagram for the entire period of working under the BFP;

- recommend students the necessary literature: the laws, reference materials, textbooks, manuals, and other sources according to the topic;

- Conduct regular consultations for the student;

- Check the progress of the work.

The task determines the entire process of further independent work of the student on BFP theme. On the basis of the task the student as agreed with his supervisor writes the schedule diagram of the BFP. On fixing the deadline for the completed BFP presentation the final word rests with the supervisor who guided the curriculum, defining the terms of the BFP protection.

All student's work on BFP lasts for 10 weeks. Throughout this time the graduating department carries out percentage certification ("progress certification") on the progress of the work according to the following schedule:

Table 1

The chart of holding a progress certification

# of weeks	1	2	3	4	5	6	7	8	9	10
attestation #		1 progress certification		2 progress certification		3 progress certification		4 progress certification		progress certification

The supervisor of the graduation project passes the report to the SAC secretary on each progress certification which provides information on the project done by the student at that moment in percentage in the form of the table 2, as well as comments on each of the diploma project.

Table 2

Report on "progress certification" #__ of the graduation projects supervisor
Last Name, First Name and patronymic of the supervisor

Name Surname Patronymic	Introduction	Requirements analysis	Design	Software documen-tation	Experimental	Conclu-sion	Software work	Presen-tation

Fulfillment of any section of the BFP explanatory note in the volume of 100% put only when the bachelor student submits the final variant of the work in the printed form, herewith, the supervisor puts deadline for the completion of the work in the

blank "Task for BFP". Fulfillment of the software product is estimated at 100% when it runs smoothly, accurately and solves the problem, which must be demonstrated by test examples.

BFP preliminary defense passes within a week (preliminary presentation) on which the student is admitted to the defense. Complete project (bound explanatory note, the software product) and the supervisor's reference must presented on the preliminary defense. The reviewer is appointed on the BFP preliminary defense and is channelized to it.

Only those students, who have no academic debt, got the admission on preliminary protection of the BFP and those who have the supervisor's reference and review to the work are allowed to defense.

8. THE PROCEDURE ON DEFENDING THE BFP

Preparations to defense

Department establish the date for the BFP defense and the deadline for their putting on the department.

Within the specified period a student must pass the explanatory note to the BFP supervisor, it must be designed in accordance with the stated requirements.

The supervisor gives written feedback about the BFP (not later than 10 days before the defense.) Review should include information on the main results obtained by the student in person, a general description of the task performed on BFP, and the conclusion about the possibility of being allowed to defense.

The supervisor points out his assessment for the qualifying work on the review ("excellent", "good", "and satisfactory").

Initial recommendation on introduction, publication of the results of work, and enroll in a Master's and doctoral studies should be given by the supervisor.

The supervisor signs the cover sheet of the BFP and together with his own review in writing form represents the BFP to the Head of the SCS Department (Software of Computer System).

On the basis of these materials the Head of the Department should decide on student's admission to the defense, making the corresponding entry on the title page of the BFP.

If the Head of the Department finds it possible to allow the student to protect his project, then this issue is discussed with the supervisor and the student at the faculty meeting. Minutes of the faculty meeting should be represented for approval to the rector of the university through the dean of the faculty.

The BFP admitted to the defense by the graduating department should be sent for a review.

The member of the reviewers determined from the number of experts - practicians. Reviewers can also be teachers (professors, associate professors and master teachers) of other higher education institutions or the teachers of this university, if they do not work in the graduating department.

BFP must be submitted to the reviewer not later than 5 days till its protection in the SAC. The reviewer should return the project with a review at the Department not later than two days till its protection.

The written review should contain an assessment of the following elements of the project:
• relevance of a subject;
• volume and structure;
• the goals and objectives of the research;
• the completeness and consistency of materials, goals and objectives of the research;
• compliance of the contents and registration of the project to qualifying standards (registration of the text, tables, literacy of a statement, writing style, etc.);
• The character of the project (creative and descriptive);
• theoretical and practical significance of the project;
• validity of the conclusions and proposals.

It is necessary to specify in conclusion whether the reviewed work meets requirements imposed to the BFP.

The reviewer has the right to invite the student to explain the issues. The reviewer signed the BFP on the title page.

In case of the negative review and the positive conclusion of the supervisor, the head of the faculty sends the BFP to another specialist for additional review, after which it is sent to the SAC. At the request of the student the BFP with a negative review can be sent to the SAC for protection without additional review.

The students who have fully complied with all the requirements of the curriculum and study programs are allowed to protect the BFP.

The BFP with admittance of the graduating department and with the supervisor's reference and expert's review is sent to the SAC for protection.

According to the bachelor student's willing materials describing the practical value of the BFP can be sent to the SAC, for example, documents (reviews, decision), pointing to the practical use of the proposals, published articles on the subject of work and other materials. Presented materials can contribute to the disclosure of the practical value of the BFP.

After preparing the BFP to defense, the bachelor student prepares a statement (report), visual information - charts, tables, graphs and other illustrative material for use them in the SAC during the defense. Special handouts can be made for the members of the SAC.

BFP Protection procedure

Protections are held on the public meetings of the SAC. The student is allowed to defend in the SAC in the presence of the BFP which is signed by the head of the faculty and with the supervisor's reference and review. If the author of the reference or a review is absent, it has to be read by the secretary of the SAB.

Protection Procedure provides:
- Presentation of the bachelor according to his personal file by the secretary of the SAC, proclaiming the project topic;

- Bachelor's report according to the project materials (7 - 10 min);
- Answers to questions (answer requires to be brief, accurate and to the point);
- Announcement of the supervisor's reference and review;
- Bachelor's final word (1 - 2 minutes, emphasizing those aspects of the report, which needs to be clarified according to the student's opinion)
- Discussion of reports by the members of the SAC.
- Announcing the results of the BFP protection by the Chairman of the SAC.

The report proves the actuality of the project, its theoretical and practical significance, it also formulates the goals and an objective of research, briefly describes the main content of the project (how the goals and objectives of the project had been solved). Pay attention to the most important aspects of the BFP, state conclusions and recommendations result from the study and emphasize the novelty of the project.

The average duration of protection per student is no more than 20 min., but this time is flexible and determined by the Chairman of the SAC.

Upon completion of all planned defense for this meeting, the SAC holds a closed meeting, where determined the grades of all the defenders according to the scale as "excellent", "good", "satisfactory," "unsatisfactory".

After the end of the SAC the protected BFP shall be recorded and hold to the graduating department for storage.

It is not permitted to use the qualification works as learning aids, even in terms of their design and structure for writing the BFP.

According to the decision of the dean's office, students who were not present at the meeting of the SAC for an excused absence may defend their projects on the next meetings of the SAC.

Appeals by the put-down marks are not accepted.

List of sources used

1. Салиев А.Б., Стамкулова Г.К., Тен И.Г., Мусина И.Р.,Макиева З.Дж. Методические указания к выполнению выпускной работы бакалавра по направлению 552800 - «Информатика и вычислительная техника» //Кырг. гос. техн.ун-т, Бишкек, 2010. – 26

Appendix 1

Kyrgyz State Technical University
Named after I. Razzakov

Information Technology Faculty

Software Engineering Department

Bachelor`s final paper

Theme: Development of distributed interactive access system to the results of
magnetotelluric monitoring

For engineer qualification course: 552800 Computer Science

Specialty: 552801.04 software computing

Made by: Student of IVT 1-06 group Ten V.
Project leader: Lychenko N. M.

Bishkek 2014

Appendix 2

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The Ministry of Education and Science of Kyrgyz Republic
Kyrgyz State Technical University
Named after I. Razzakov
Information Technology Faculty
Software Engineering Department

Calculation and Explanation Summary
for
Bachelor`s final paper

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Theme: Development of distributed interactive access system to the results of magnetotelluric monitoring

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Made by Student of POVT-2-06 group
Aldoshkin Nikita Mikhailovich

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Project Leader Kydyraliev Nurlan Nasirdinovich
Consultants:
1) **Economic Section:** Ibragimova Gulai Kaibyldaevna
2) **Checking Section:** Stamkulova Guldana Kubanychbekovna

The project is allowed for defending of final bachelor works
The head of Department:
Ten Iosif Grigoryevich
Reviewer:
Djanserikov Tursun Djakshibekovich

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Bishkek 2014

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Appendix 3

Kyrgyz State Technical University
Named after I. Razzakov
Software Engineering Department

"Approve"
Ten Iosif Grigoryevich
the head of Department_____

Task

for bachelor work`s execution by student of POVT-2-06 group
Aldoshkin Nikita Mikhailovich

Project theme: Development of distributed interactive access system to the results of magnetotelluric monitoring

Approved by faculty`s order № 08-8-96 from   2015, March, 22

Deadline of final project   2015, June, 15
Source data: MS SQLServer
Used software: CASE tools, MS OFFICE 2010, MS SQL SERVER,PowerBuilder